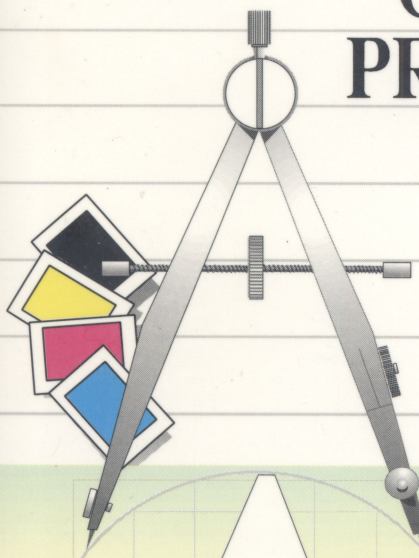
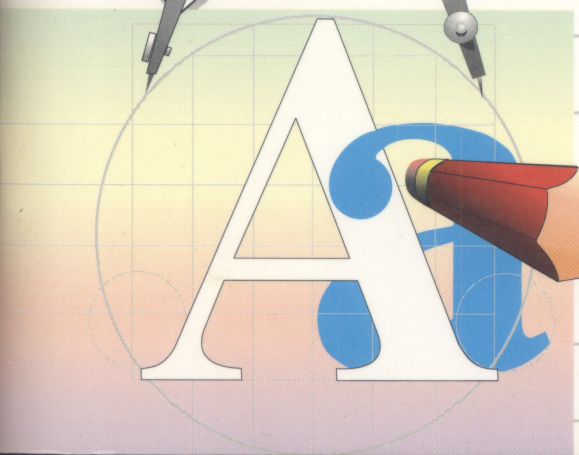
Art Works

COMMERCIAL PRINTING GUIDE





Computer Concepts Ltd

Commercial Printing Guide

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INTRODUCTION

This supplement gives information about preparing work for printing by a commercial printing company. It includes hints and tips on getting the best results. Also, just as important, pitfalls to watch out for and problems that may arise.

Most of this supplement concerns preparing work for litho printing. This is probably the most common printing method for print runs over a few hundred copies. It is a well established process (although some parts of the technology are still advancing). It is suitable for most types of work from a few hundred leaflets to multi-page newspapers. However it is unsuitable for short runs (below 300-500 copies) for which the only economic answer is photo-copying. (There are other printing methods not covered here. Some – such as letter-press – are now rarely used. Others – such as Intaglio – are only suitable for very long runs – 50,000 as an absolute minimum.)

PHOTO-COPYING

For short-runs (up to about 500 copies) this is an economic process. Also, there are relatively few technical problems in producing originals for photo-copying. Quality depends on the model and condition of the photo-copier and on the skill of the operators.

Black-and-white copying is a well established technology and gives excellent results. Most towns have several copy bureaux or instant print shops which can copy work for you.

Colour photo-copying is relatively recent. Because the technology is evolving so rapidly, any information we might give will soon be out-dated. The best advice is to talk to your local copy bureau. Currently some processes cannot accurately reproduce the entire colour range. Try a sample print of your original for colour reproduction.

For photo-copying you need a good quality original. For black-and-white work a laser printer produces an acceptable result. For coloured originals colour bubble-jet printers are suitable. Remember – the better the original, the more likely you are to get good copies.

A BACKGROUND TO LITHO PRINTING

This is a very brief description. There are many books available on printing if you want more information.

Printing, like most trades, is riddled with jargon and technical terms. We have limited the jargon to a few common terms you might come across. Jargon is shown in *italics*.

A printing machine cannot use your original directly. Instead the image is transferred onto a *printing plate*. (Often just called a *plate*.) How the image is transferred is described later.

The plate is then mounted on the press. As the press runs, the image on the plate picks up ink from a reservoir. The ink is then transferred via a rubber roller onto the paper. This prints one colour of ink onto the paper.

Most presses can only print one colour at a time. To change the colour you have to clean the existing ink out of the reservoir (this is called *washing-down*), change the plate, set the machine up again and print the paper a second time. This takes time and of course you, the customer, get charged for it.

More complex presses can print two or more colours in one pass of the paper through the press. The drawback is they need skilled operators and they take longer to set up at the start of each job. This means they are only suitable for long print runs (several thousand copies).

TRANSFERRING YOUR ILLUSTRATION ONTO A PRINTING PLATE

It is possible to transfer the image directly from a computer onto the printing plate. However at present (September 1992) this is very new technology and suffers from the usual defects of any new process – it is expensive and does not yet produce top-class results.

So, for now, you have to use less convenient methods. This involves producing an original (often called *camera-ready artwork* or a *mechanical*). The printing company uses this original to create a printing plate. For simple black-and-white work you can produce the original on a laser printer or, at a lower quality, a bubble-jet.

Higher quality and colour work requires an imageset original. For this, you generate ArtWorks or, more commonly, PostScript disc files. You take or send these files to an imagesetting bureau and get them to produce the original on a machine called, not surprisingly, an *imagesetter*. There are two types of material used in imagesetting:

- photographic paper (referred to as *paper* or *bromide*) or
- film.

Imageset and Typeset are generally used interchangeably. We prefer the technically correct Imageset.

Bromide is cheaper but, because it has to be photographed to produce the plate, cannot be used for the best quality work. Film can be used to make the plate directly and so there is no quality loss. Film is also preferable for multi-colour work. The printing company will advise you which is the best material for a particular job.

Special requirements

For some specialised work, camera-ready copy is not required. For example, the company that prints the ArtWorks disc labels prefers disc files in Illustrator format. This lets them easily manipulate the files to suit the unusual requirements of their presses.

ArtWorks can generate files in most common formats such as Illustrator and CorelDraw. (See the main manual for details.)

PRINTING A RANGE OF COLOURS

Many illustrations can be printed with just one or two different colour inks (spot colour work). You can extend the range of any basic colour by using tints. For example, tints of black give shades of grey; a medium red tint is pink.

Tints are printed as a series of small dots instead of solid colour. Very light tints (less than 10%) or very dark tints (over 95%) rarely print satisfactorily. The very small dots required for light tints cannot carry enough ink and so do not print. Conversely, the larger dots on dark tints carry too much ink and merge together to print as solid colour.

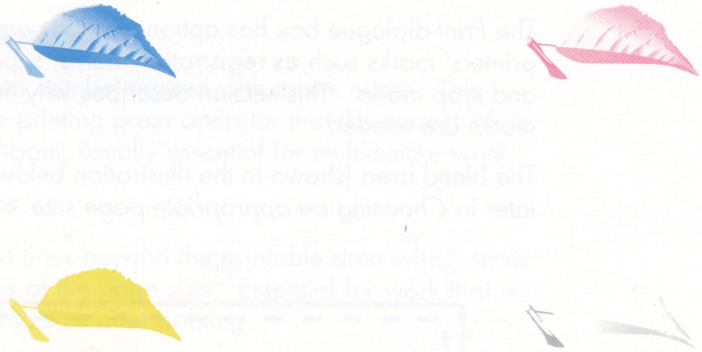
The halftone screen is completely different to the monitor screen attached to your computer. Originally a halftone screen was a sheet of engraved glass. In the computer halftones are generated mathematically.

For PostScript devices you can specify the halftone screen setting (in the *Print* dialogue box). This setting determines how noticeable the individual dots are. Screens are measured in lines per inch (lpi); that is, the number of halftone dots to the inch. You can easily see the dots at lower settings (60-90 lpi). (Most 300dpi laser printers use a 60 lpi screen.) This is too coarse for high quality work.

For monochrome work – work using only one ink colour – a screen of 100-120 lpi is sufficiently fine to deceive the eye into ignoring the dots.

Colour work requires an even finer screen, usually 150 lpi. (Very high quality work, such as fine art books, uses screens of 200 lpi or more. However, these use photographic rather than computer production methods.)

Different screens – left to right, 60, 110,150



Part of the apple separated into its cyan, magenta, yellow and black components

Full colour printing

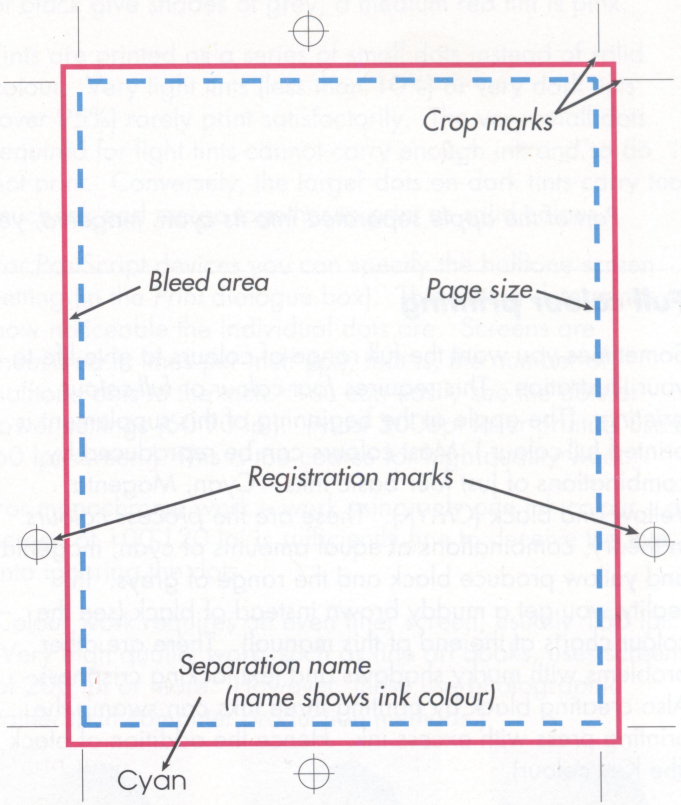
Sometimes you want the full range of colours to give life to your illustration. This requires *four-colour* or *full-colour printing*. (The apple at the beginning of this supplement is printed full-colour.) Most colours can be reproduced by combinations of just four basic inks – Cyan, Magenta, Yellow and Black (CMYK). These are the *process colours*. In theory, combinations of equal amounts of cyan, magenta and yellow produce black and the range of greys. In reality, you get a muddy brown instead of black (see the colour charts at the end of this manual). There are other problems with murky shadows and text lacking crispness. Also creating black by printing three inks can swamp the printing press with excess ink. Hence the addition of black (the Key colour).

ArtWorks can separate the illustration into its CMYK components and create a disc file with this information. This is called *separating the illustration*. There is more information on producing separations later in this manual.

PRINTERS' MARKS

The *Print* dialogue box has options for the commonly used printers' marks such as registration marks, separation names and crop marks. This section describes why the various marks are needed.

The bleed area (shown in the illustration below) is described later in *Choosing an appropriate page size*.



Registration marks

These are almost essential for multi-coloured work. They appear in exactly the same position on each separation so

that the printing company can align the separations when preparing the plates and during printing.

Separation names

Each separation can be marked with its ink name. This confirms to the printing press operator that the correct ink is being used. Again, usually essential for multi-colour work.

Crop marks

These are short lines beyond the printable area which show the outer edges of the page size. Essential for work that is cut or trimmed to size after printing.

PLANNING YOUR DOCUMENT

A small amount of thought before you start can save you time and money later on.

Some advice...

First and most important – talk to the printing company before you start. Or talk to the magazine publisher if that's where your work will be printed. Printers are generally helpful people and well used to giving advice. (After all, they want to avoid problems when the job finally reaches the printing press.) They will tell you the required format (film or bromide) and maximum halftone screen for a particular job.

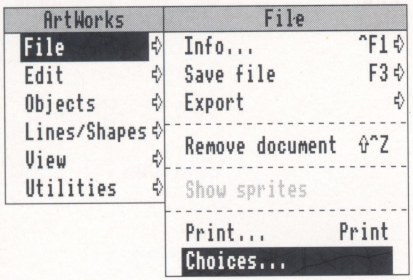
They can also advise you of any limitations of the chosen process. For example, the ArtWorks disc labels are produced on a specialised press that can print up to four colours. You load a reel of paper in one end and you get printed labels out the other. However, you can never print more than four colours – the press cannot do it.

A second piece of advice is don't get too ambitious too soon. Full four-colour printing is a very complicated, skilled and expensive process. If possible, start with simple jobs. Also spot colour work is technically simpler than four-colour.

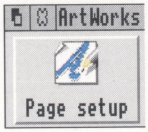
Two or three spot-colour work will always be cheaper than full four-colour.

Choosing an appropriate page size

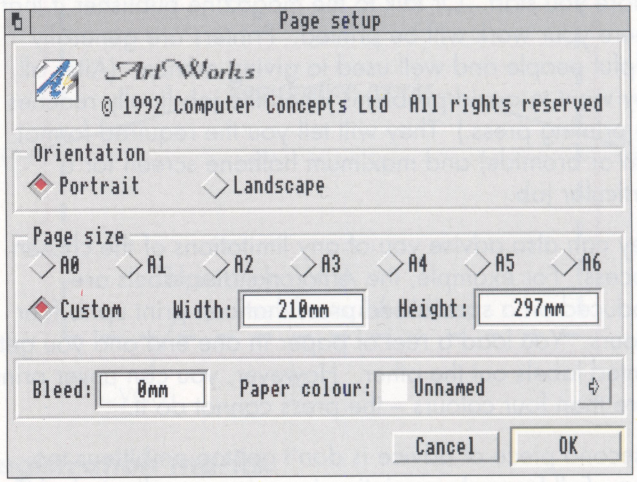
The default size of an ArtWorks page is A4 (210x297 mm). If this size is unsuitable for a particular job, you can change it at any time. However, it makes sense to set the page size before you start.



Choose *Choices* on the File submenu.



Click on *Page size* to display the page set-up dialogue box.



The page size you choose should be the size of the finished sheet of paper after printing and any necessary trimming to size.

There are two problems if your illustration prints to the edge of the paper:

- Very few printing presses can print to the edges of a sheet of paper. There is usually a non-printing margin around the edges gripped by the paper-feed mechanism. If your illustration runs to the edge, the printing company may have to use a larger size of paper and then trim it to size afterwards. This can increase paper and production costs.
- The illustration needs to continue beyond the finished page size to allow for any errors when trimming to finished size. This is called *bleeding*. Normally a bleed of 3–5mm is sufficient. The page size dialogue box lets you specify a bleed. Again bleeds increase the size of paper required.

If you change the page size slightly, the printing company may be able to make maximum use of the sizes of paper suitable for their presses. Most presses use A paper sizes. Small presses use A4; larger presses A2 or A3. In fact most A2 presses can handle slightly larger paper (SRA2) which can print a full A2 page plus crop marks. (Or two A3 pages or four A4 pages.)

Avoiding problems with graduated fills

A graduated fill can show a muddy grey band. This is caused by filling from two of the primary CMY colours to the third. For example, a fill from red (100% MY) to cyan (100% C). In the middle of the fill is 50% each CMY which is grey. (Because of imbalance between the inks, it is a muddy grey.) It is better to fill between colours which share primaries. For example, red (100% MY) to blue (100% CM) always has magenta present and the mid point is dark magenta (100% M, 50% CY)

A similar problem is fills from any combination of CMY to Black. This is because the pre-defined black is defined as 100% black, 0% CMY. Thus, any colour graduating to this black will see the three colour components becoming less as the black component increases, leading to a washed out grey towards the end. The solution is to define a special

black (still as a process colour, not a spot colour) which is identical to the start colour, but has a 100% black component. This will give the required result. If the area containing the fill is very large, it might be better to go to a black made up of 50% of each of the four components. This avoids swamping the printing press and the paper with ink.

Registration black

This is a special colour. Anything in registration black appears in all separations. This is useful if you want to include information such as a file name or production date on a set of separations. Except for such information, you should avoid using registration black in your illustration.

COLOUR LIMITATIONS

The Colour handling section of the main manual gives further information. This section gives some information specific to printing.

The available range of colours

Firstly, CMYK can reproduce a wide range of colours. However they cannot reproduce the entire spectrum and some colours are completely unobtainable. Either you can avoid these colours or, if essential, use an additional spot colour. Remember that each extra spot colour requires another plate and pass through the printing press (and so extra cost to you).

Colour differences between the computer screen and the printing press

The computer screen emits combinations of red, green and blue (RGB colour model). The printed page reflects cyan, magenta, yellow and black (CMYK model). There will obviously be differences between how colours appear on screen and on the page. Even the colours on the screen can alter dramatically with changes in ambient lighting and screen brightness and contrast.

Some colours which are easily reproduced in RGB give problems in CMYK. An example is deep blue. In RGB this is 100% blue. The direct translation to CMYK is 100% cyan and 100% magenta. Unfortunately magenta usually dominates slightly and the resultant colour has a purple tinge. (A better dark blue is usually a cyan/black mix.)

The normal 16 colour screen palette does not show cyan or magenta correctly. (Magenta and red appear as the same colour.) You can improve the colours shown by choosing *Primary palette* on the ArtWorks Program Menu. This has a selection of colours better suited to the CMYK colour model. *Primary palette* has no effect in 256 colour modes.

Even using the primary palette, the colour that appears on a printed page can be substantially different from the colour you perceive on the screen. The colour samples at the back of this guide will help you assess the final shade of a printed colour.

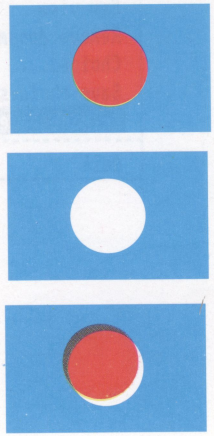
Technical limitations of the printing process

The press is constantly drawing ink from its reservoir, passing it over various feed rollers, onto the plate and finally onto the paper. How much ink flows onto the paper depends on the settings and condition of the press, the type of paper used and environmental factors such as the temperature and humidity. Obviously many of these factors are constantly changing. A skilled press operator has to adjust the press whilst running the job to ensure a consistent result. Invariably there will be minor differences in the colour balance during the print run. These should be relatively minor with a good printing company.

Secondly, for a specific spot colour the printing company usually has to mix a batch of ink from other basic colours. They have charts showing the proportions to use but obviously it is difficult to get the proportions exact. This is a particular problem with off-white shades where the proportions can be as high as 95 parts white to 1 part modifying colour. These shades are almost impossible to mix consistently.

USING OVERPRINTING

Overprinting is used for multi-coloured work to compensate for misalignments during printing. If your illustration includes overlapping objects which use different ink colours, misalignment can create thin white or coloured lines between the objects. (The technical term is *out-of-register* or *mis-registration*.)



How does this happen? Suppose your illustration has a red circle on a cyan background with no overprinting.

When the illustration is separated, the cyan plate has a non-printing area underneath the circle. (The technical term is that the circle *knocks-out* the background.) The knock-out is precisely the same size as the circle.

If the illustration is not printed exactly in register a white crescent appears between the circle and the background. (We have exaggerated the effect but even thin lines can be noticeable with dark colours.) To compensate for this you use overprinting.

ArtWorks has two types of overprint:

- Ink level. Set in the *Print* dialogue box.

  Generally used for black ink (which is relatively opaque). Underlying colours are not knocked out and the black ink is simply printed on top.

  Less opaque inks may show a colour shift when overprinted. For example, magenta and yellow overprinted gives red.

- Object level. Set using the Colour menu.

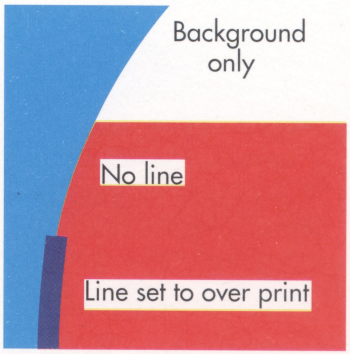
  You can specify individual objects to overprint. (Usually when two dark coloured objects overlap.) You can separately specify overprint for the line and the fill colours. (In practice, you would specify either (a) the line to overprint or (b) both the line and the fill to overprint. Only rarely, if ever, would you specify just the fill to overprint.)

Overprinting both the fill and the line are similar to ink level overprint. That is, the underlying colour is not knocked-out and the object is simply printed on top.

Setting only the line to overprint is the normal way of compensating for mis-registration. The printing company can tell you how much tolerance to allow (usually 0.5pt to 1pt).

Overprinting lines

If you add a 1pt line to the red circle and set it to overprint, it extends onto the background by 0.5pt. This is usually sufficient. The line colour depends on the background and object colours. Usually, set it to the lighter colour (cyan in this case) as it is less noticeable. This illustration uses a dark blue line to make it obvious.

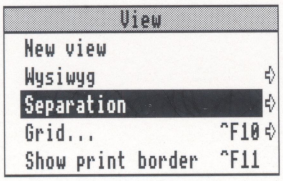


CHECKING AND PROOFING YOUR ILLUSTRATION

The computer monitor has a lower resolution than high definition printers and imagesetters. Also, as already described, the colours shown on screen can differ from what will be printed. For this reason, you normally have to proof your work before it is printed. There are various proofing processes which give a good representation of the finished result.

For quick checks you can just print the document to the printer connected to your computer. You can spot many potential problems in this way. For black-and-white work this is often good enough for checking your work. However there are differences in tints between your computer's printer and imagesetters – dark tints appear darker on an imagesetter and light tints lighter.

The biggest need for checking and proofing is when using colour. In fact, for four-colour work, proofing is almost essential. (Proofs are expensive but not as expensive as re-printing a job that has gone wrong!)



While you are preparing the illustration you can check how the colour separations should appear by using the *Separation* menu option. This displays on screen how the individual colour separations should look. *View separations* is useful for checking that the overprint settings are correct and for colour components. The lower resolution of the monitor screen limits the amount of detail that you can see, but this option helps build your confidence that the separations will be correct. At WYSIWYG 11 the separations are shown in their ink colours; WYSIWYG 10 or below shows the separations in black.

There are a wide range of colour proofing methods ranging in quality and cost from colour ink-jet printers to printing proof copies on a special printing press. (Printing proof copies gives the best results but are far too expensive for normal use.)

Colour ink-jet printers are now relatively low cost and can provide reasonably accurate colour proofs. The cost of printing a page is relatively low (less than a pound). Because of the low cost, they are also useful during the planning stage when you are trying to visualise the finished document.

For four colour work, the best practical results come from Cromalin or Matchprint proofs – Cromalin is used as a generic term. (Cromalin is a Du Pont process; Matchprint is 3M's equivalent. The differences between the two processes are small.) These are produced directly from the set of four film separations and give an excellent colour match. They cannot show spot colours. Cromalins are expensive – about £30-£70 for an A4 page (plus the cost of producing the film separations). Not many companies can produce them but the printing company or imagesetting bureau will know local availability.

GETTING YOUR DOCUMENT IMAGESET

First you have to find an imagesetting bureau. There are almost certainly several in your area; look in *Yellow Pages* and other local directories under *Typesetters*. You may also find bureaux that can handle Archimedes discs advertising in the specialist Archimedes magazines. However, not every bureau will offer the services you want and some will give a better service and price than others.

What to ask a bureau

When looking around for a bureau, here are some of the questions you should ask:

- **What format discs can they read?** A few bureaux can read Archimedes discs. If you find one that can, it will save you a lot of work. Can they read ArtWorks discs; if not, you will have to supply them with PostScript files.

  If they cannot read Archimedes discs, you will have to supply PostScript files on PC format discs. Make sure, however, that they can read 3½" discs and not just the older 5¼" discs. (Many bureaux use Apple Macintosh computers – most of these can read PC format discs.)
- **What do they charge per page?** This depends on the size of the page and whether you want film or bromide. Also, ask them if they have a surcharge on pages that take a long time to print. This can seriously increase your costs if you have a complicated illustration. Some bureaux charge on a time basis, others on material used.

  Finally, check if they have a minimum charge.
- **How fast can they turn work round?** Invariably, getting work set quickly will sometimes be a priority. Some bureaux only offer a mailing service – you send them a disc, they send the results back. This may only take a day, but you may need results faster than that. Other bureaux can sometimes offer a

'while you wait' service. (If it's a quiet day and they have the correct material loaded in the imagesetter, many bureaux will try to fit in urgent work.) Often there's a premium for this and some bureaux offer this service only to regular customers.

- **Can they set the page size you want?** Different imagesetters have different maximum page sizes. Generally there's no problem up to A3 but many bureaux cannot set larger sizes.

  Remember crop or registration marks increase the overall dimensions of the document. ArtWorks automatically calculates any additional extra width and height and stores this information in the disc file.

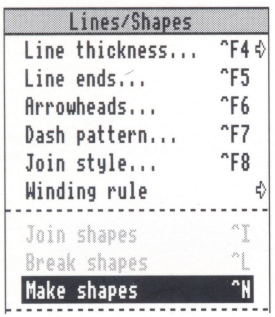
See Font matching (below) for details of how to match Acorn and PostScript fonts names.

- **Do they have the fonts you want?** The quickest way to set any text in your document is to use a suitable font in the imagesetter. However, some Archimedes fonts have no PostScript equivalent. (Many of the extra fonts supplied with ArtWorks have no PostScript equivalent.) Also the bureau may not have the particular font you require. (PostScript fonts are generally far more expensive than Archimedes fonts.)

  If a suitable PostScript font is not available, there are two alternatives:

  • Computers fitted with RISC OS 3 can send a special version of an Acorn font to the imagesetter. See below for more details.

  • Convert the problem text to shapes. (Use the menu option *Make shapes*.) This converts the characters into a series of lines and curves which do not require an equivalent PostScript font. Make sure the text is correct before converting it as you cannot easily correct any mistakes spotted afterwards.



Font matching

As described above, equivalent Acorn and PostScript fonts usually have different names. (Many PostScript names are proprietary trademarks.) You have to match the two names before you can use the PostScript font. The PostScript printer drivers contain a default list of equivalent names but you may want to add new fonts to the list. How you do this depends on which version of RISC OS is fitted in your computer.

If you have RISC OS 2:

The Impression Business Supplement includes Expression-PS which lets you easily match font names. Refer to the Impression Business Supplement manual for details.

Impression Business Supplement is available as a separate package – contact your local supplier for details and prices.

If you do not have Expression-PS, you will need to edit a file within the PostScript printer driver, *PrinterPS*. To do this:

1. Hold down the *Shift* key and double-click on the *PrinterPS* icon in a directory window. This opens a window onto *PrinterPS*.
2. Load *PSprolog* into a text processing application such as *Edit*.
3. At the end of *PSprolog* is a list of font equivalents. Add new fonts into this list. Make sure that you use the correct format:

   /Trinity.Medium /Times-Roman Latin1Enc FF

   where

   Trinity.Medium is the full name of the Acorn font (with the family name – *Trinity* – and variant name – *Medium* – separated by a full stop).

   Times-Roman is the full name of the PostScript equivalent. (The imagesetting bureau can tell you the correct name and format.)

   Make sure the font names start with a slash (**/**) and are correctly punctuated.
4. Save *PSprolog* back to *PrinterPS*.

The changes to *PSprolog* take effect immediately – you do not need to reload *PrinterPS*.

If you have RISC OS 3:

RISC OS 3 gives you three options for fonts:

- Map the Acorn font name to the PostScript font name. (This is the recommended method but there must be a matching PostScript font available.)
- Send the Acorn font to the imagesetter, run the file and then delete the font from the imagesetter. (*Download the font.*) Downloading the font increases the file size and increases the time required to send the file. However it allows the use of any Acorn font, even those without a PostScript equivalent.
- Send the Acorn font, run the file but leave the font resident in the imagesetter. (*Permanently download the font.*) You can only permanently download a font if the imagesetter is connected to the Archimedes. We cannot recommend permanently downloading a font. The downloaded fonts occupy memory in the imagesetter even after your file has run. The bureau may have to reset and reinitialise the imagesetter to regain the memory. This takes time and is annoying to a busy bureau – it will not help create a good working relationship with the bureau.

Mapping fonts:

Refer to the RISC OS 3 User Guide for details of using FontPrint.

On RISC OS Application Disc 1 is *FontPrint* which provides an easy way to map fonts. (Remember to punctuate the PostScript font names correctly – check with the bureau if in doubt.)

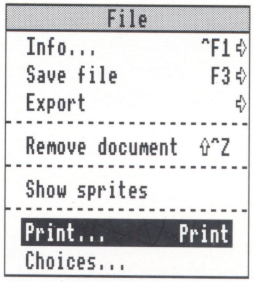
Downloading fonts:

Any unmatched fonts are automatically included in a PostScript file. They are then downloaded to the imagesetter when the file is run.

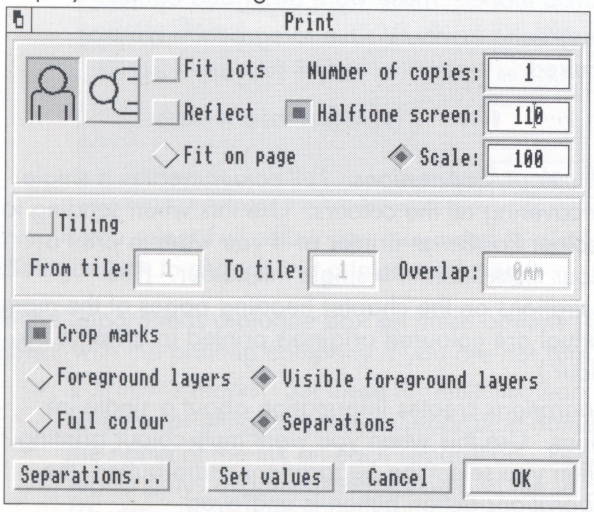
As described above, downloaded fonts increase the file size and the file takes longer to load. Tell the bureau if your file includes several downloaded fonts. They can then allow extra time for the file to load and not assume a fault.

Creating a PostScript file

Load a suitable PostScript printer driver. Use *PrinterPS* for RISC OS 2. With RISC OS 3 you have a wider choice. Use *Generic* for output to a colour PostScript device. Use *Generic, Linotronic 100,* or *Linotronic 200* for separated output. In all cases set the printer driver to print to file. (The *User Guide* supplied with your computer describes how to do this.)



Display the Print dialogue box in ArtWorks.



Set these options (§ denotes check with the printing company if you are not sure):

- *upright* or *sideways* orientation as appropriate.
- *Fit lots* **off**.
- § *Reflect* – use this to create a mirror image.
  Bromide is normally *Reflect* **off**.
  Film is usually, but not always, **on**. Ask the printing company what is required. Set *Reflect* **on** if they ask for *emulsion side down*; **off** for *emulsion side up*.
- *Scale* **on**. Type the required scale into the editable field.

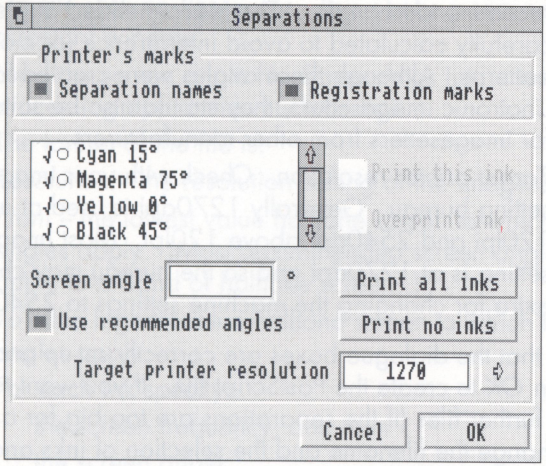
- § *Number of copies*. Check with the printing company how many copies of the original they need. Sometimes two or more copies can be printed at the same time on a large sheet of paper. This may save you money.
- § *Halftone screen*. Usually 100-120 for monochrome work, 150 for four-colour.
- *Tiling* **off**. (Tiling is usually only used for desktop printers.)
- § *Crop marks*. These were described earlier.
- *Foreground layers/Visible foreground layers* as required.

Refer to the main manual for more information on visible and invisible foreground layers. Remember that background layers are never printed.

- *Full colour/Separations*. *Full colour* creates a single file covering all the colours. Use this when sending to a colour PostScript printer or if you want to print a colour illustration in a single ink colour. (The illustrations on the chapter heading pages of the main manual are coloured originals printed in a single ink colour.)

  Separations creates information about a single ink colour. Use this when you want multi-colour printing. When you select the *Separations* radio button, the *Separations* action button is ungreyed.

Click on the *Separations* action button to display the second print dialogue box.



Even if you select *Full colour* you may need to display this dialogue box to change the printer resolution.

In the Separations dialogue box set these options (§ denotes check with the printing company if you are not sure):

- § *Printer's marks*. Set these for multi-ink work as they help the printing company. *Separation names* prints the name of the ink on each separation. *Registration marks* prints alignment targets around the image area. (These were shown in an earlier section.)
- *Ink names*. The main manual fully describes this section. Basically you can select from the list which inks to send to this file and which inks to overprint.

  A tick against an ink name shows that the ink will be printed.

  A solid circle shows that everything in that ink will overprint. (Normally you would never overprint any colour except black.)

There is more about ink level overprint earlier in this supplement.

See below for changing the screen angles file to cater for other resolutions or recommended angles.

- *Screen angles.* Unless you are very experienced in creating PostScript separations, select *Use recommended angles.* The recommended angles are carefully calculated to avoid interference (or moiré) patterns. Although these angles were created for Linotronic imagesetters, they should also be suitable for imagesetters from other manufacturers.

These resolutions are for Linotronic imagesetters. Other makes may be different.

- *Target printer resolution.* Check with your image-setting bureau. Generally 1270dpi is used at up to 120lpi and 2540dpi above 120lpi. Most image-setting is at 1270dpi and so the bureau may charge extra for changing the machine settings to 2540dpi.

Check that the dialogue boxes are correctly set-up and then click on *OK* to create the PostScript file. If you want to create further files (if the separations are too big for a single file), change the filename and the selection of inks and then create another file.

Changing the screen angles file

This file contains a list of the recommended screen angles for Linotronic imagesetters. If your bureau uses another type of imagesetter, they may know the appropriate screen angles. You can then edit the screen angles file to include these new angles.

Please note: the suppliers of ArtWorks cannot be held responsible for any problems that may arise if you change the screen angle file in any way. It is your responsibility to ensure that any data you enter is accurate, suitable for the target imagesetter and in the correct format. We do not have any information about recommended screen angles other than those already in the file and so cannot offer advice about possible changes.

To change the file:

1 Hold down the *Shift* key and double-click on the ArtWorks icon in a directory window. This opens a window on the contents of ArtWorks. **DO NOT CHANGE OR DELETE ANY OF THESE FILES –**

ArtWorks MAY STOP WORKING OR CORRUPT YOUR DOCUMENTS IF YOU DO.

2 Double-click on *Resources*. This opens a second directory window.

3 Load the screen angle file *ScreenAngs* into a text processing application such as *Edit*.

4 The format of the file is:

Resolution – the resolution setting of the imagesetter.

From – the lowest value halftone screen to which these angles apply. (Most recommended screen angles apply to a band of halftone screens.)

To – the highest value halftone screen to which these angles apply.

For each ink specify:

the screen frequency, and then

the screen angle.

When you send the disc to the bureau...

You can now send or take your discs to the imagesetting bureau. Remember to tell the bureau:

- That the file format is pure PostScript text.
- The number of pages that should be produced and their size.
- Whether you want paper or film.
- Some imagesetters can invert the image (create a negative). Check with the printing company. Say if you want this.
- Tell them which files should be on the discs. If you send them the wrong disc, they may spot the mistake before running – and charging you for – the wrong files.
- Say if you think the files may take a long time to run. Some bureaux don't let jobs run over a certain time unless you tell them otherwise. They might stop a file that's taking a long time thinking it has crashed.

When you get the imagesetting back...

Check it carefully. You can still correct errors relatively cheaply. From this stage onwards it becomes increasingly expensive to correct errors.

Remember you can use the *View Separations* menu option to check how the individual separations should appear. This is useful for checking overprint and font matching.

On the imagesetting look for:

- Any mistakes in the drawing. The higher resolution of imageset output can show problems not previously evident. Is the drawing complete? If you are using several layers, are they all there?
- Check that any text appears correctly. Any fonts not loaded into the imagesetter will appear as Corpus (`which looks like this`). Also there may be slight differences between the same name font from two manufacturers.
- Any physical defects in the material. These are rare but not unknown.

Corpus is Acorn's name; Courier is the PostScript name for the equivalent font.

If you want a Cromalin colour proof you can get this made now from the set of imageset films.

Only one film out of a set has a mistake

Sorry, but you may have to re-run a complete set of films. It depends on the age of the set of films and how closely they need to align (the register). Films stretch slightly as they pass through the imagesetter. Also the films age and distort slightly. If you get only one film reset, it may not align with the others. Check with the printing company but if in doubt, get a complete new set. It will be cheaper than having to reprint your work if there is a problem.

SENDING YOUR WORK TO THE PRINTING COMPANY

You should now have everything necessary for the printing company to start work. Send them:

- The camera ready artwork (unless some special format is required).
- For colour work a Cromalin or other colour proof. This helps them assess the required colour balance.
- The ink colours to use. (Tell them even if you just want black ink.)
- How many copies you want.
- The finished size of the printed image.
- The required paper type and colour. (Tell them even if you want ordinary white paper.)
- Any finishing instructions (extras such as folding or laminating).

Much of this information the printing company will already know from your earlier discussions with them. However, they generally prefer confirmation that nothing has changed since then. Full information may save them a telephone call and helps build a good working relationship.

If you have followed this guide, the final printed result should be exactly as you expected. (Often it looks even better when professionally printed.) You should be able to spot any mistakes or problems at an early stage and correct them easily. (Remember, that at each stage it becomes progressively more expensive to correct a mistake.)

USING THE COLOUR CHARTS

The charts that follow show how various colour combinations will look when litho printed. The charts were created in ArtWorks, imageset to film at 150 lpi and then commercially printed. The colours shown may not exactly match the printed results you get for several reasons:

- ink flow variations during printing,
- the type of paper has an effect on the colour,
- inks fade with age and paper yellows slightly.

Don't leave this manual in sunlight for long periods as this will quickly fade the colour samples.

However, the match should be sufficiently close for practical use.

Grey component replacement (GCR)

As described earlier, 50% each of cyan, magenta and yellow theoretically produces a medium grey. However, a better grey is 50% black ink. It also has the advantage that the paper is printed with only 50% ink instead of 150% using three colours. Swamping the paper with excessive amounts of ink can cause serious problems during printing. Any colour which uses all three colours, cyan, magenta, and yellow can have a proportion of black substituted.

Grey component replacement is the substitution of a suitable amount of black for a proportion of the other colours. This is automatic for colours defined using the RGB or HSV colour models. Colours defined using the CMYK colour model are never altered. You should therefore be careful when defining colours using CMYK to avoid swamping the press with ink. Check with the printing company if you think this may be a problem.

Grey component replacement is also known by other names such as *Under-colour removal*, *UCR* and *Black generation*. Most of these names, however, describe only a part of the process.

The first chart shows Red-Green-Blue (RGB) mixes.

The second chart shows Hue-Saturation-Value (HSV) mixes.

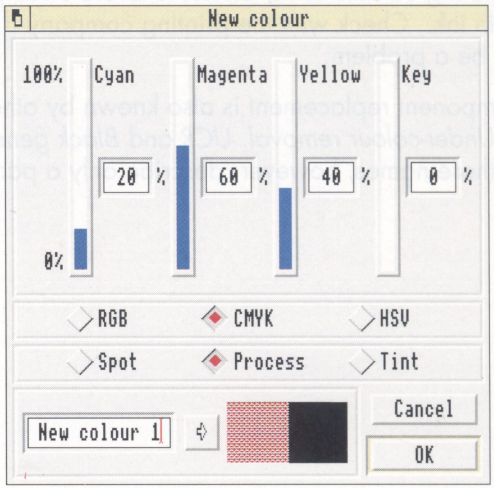
The next chart shows cyan-magenta mixes with increasing amounts of yellow.

The last chart shows black combined with each of the other process colours.

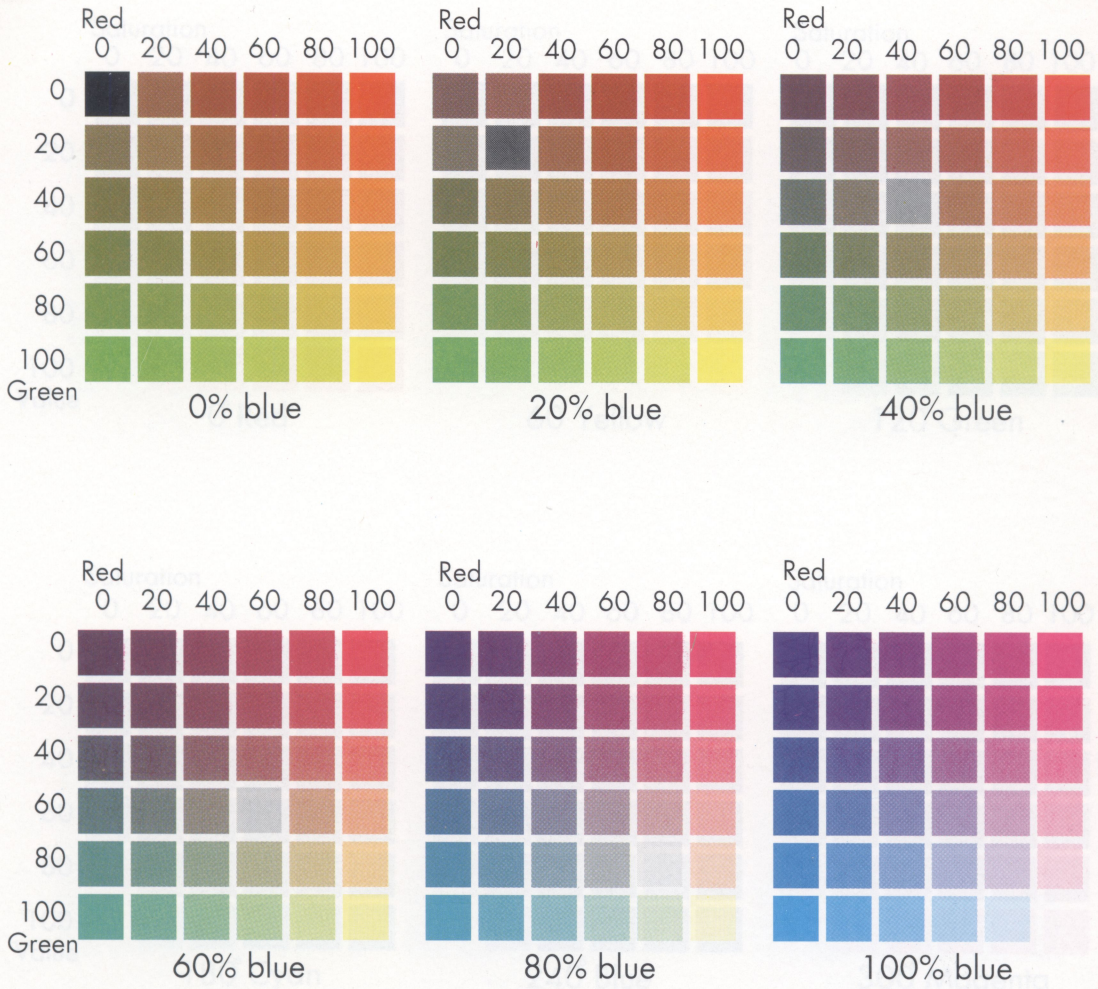
How to use the charts...

Find the colour you want. As an example, 20% cyan, 60% magenta and 40% yellow. (This combination appears on the third colour chart.)

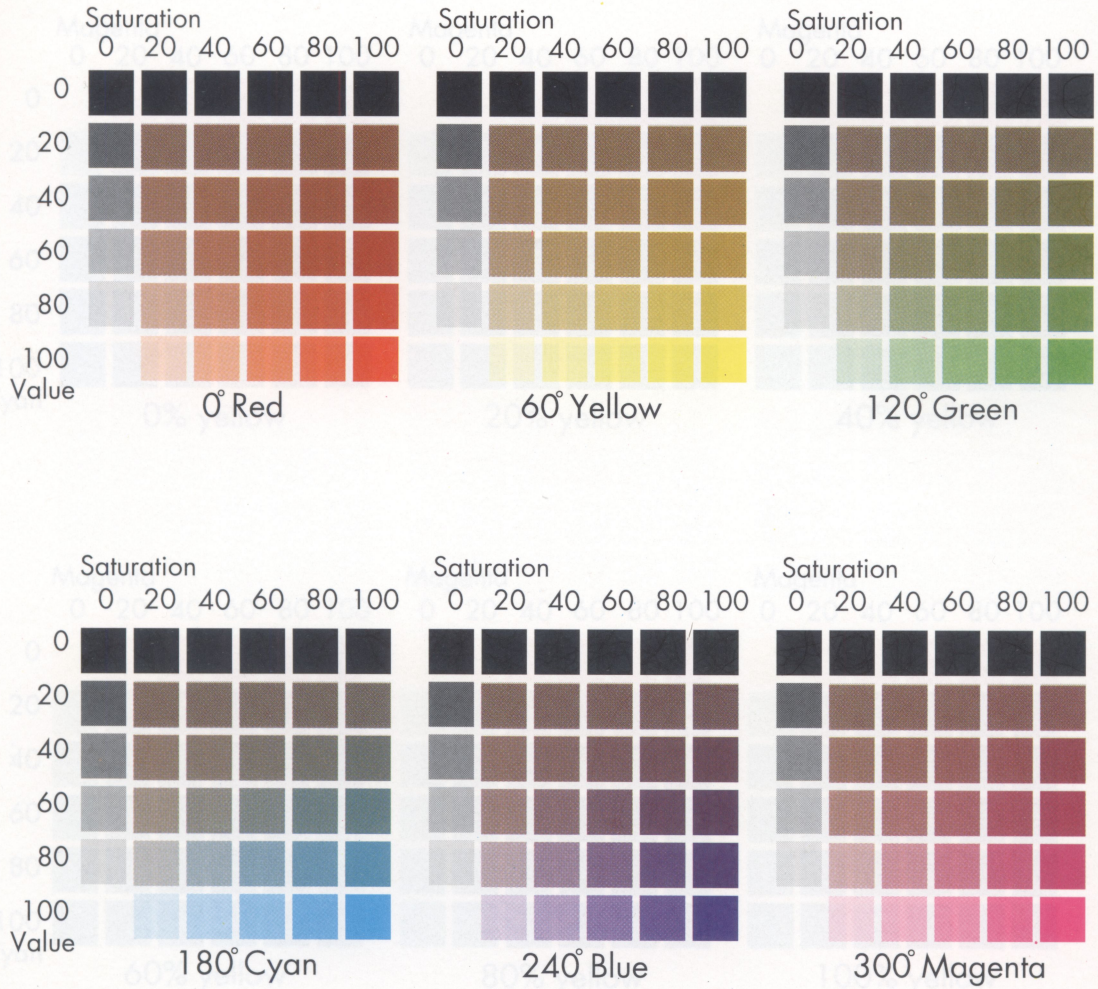
Display the colour editor and either create a new colour or edit an existing colour:



Press *Return* or click on *OK* to change the colour. Remember that the colour you see on screen may vary from the printed sample for reasons explained earlier.

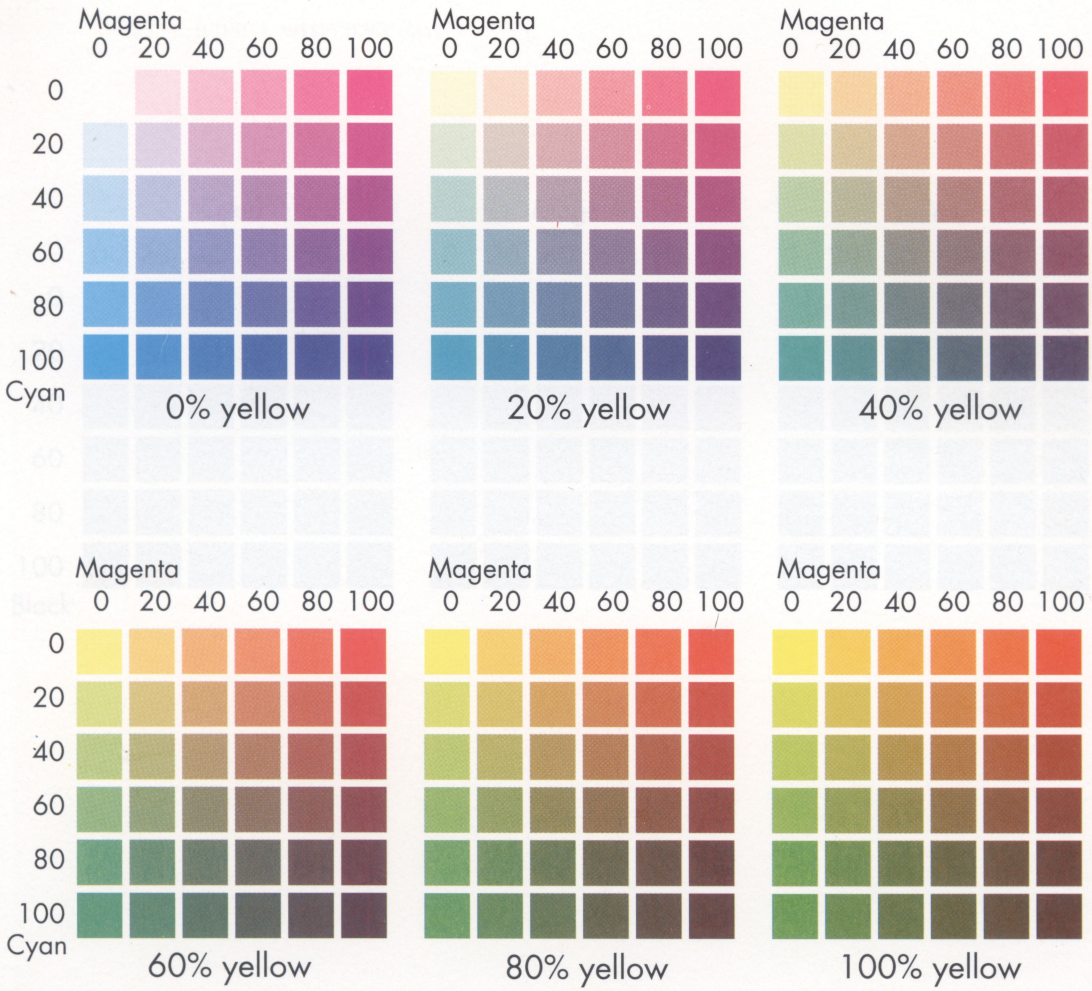


RGB colour mixes

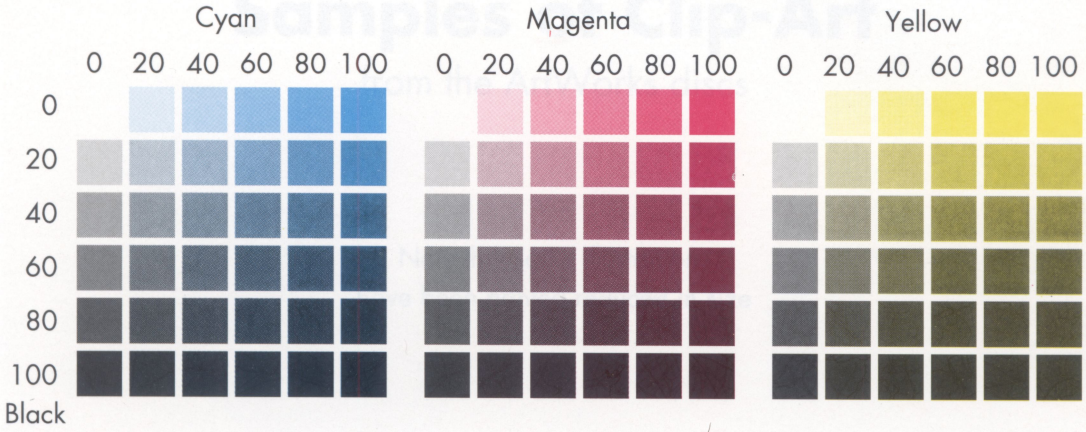


HSV colour mixes

HSV colour mixes



CMYK colour mixes - 1

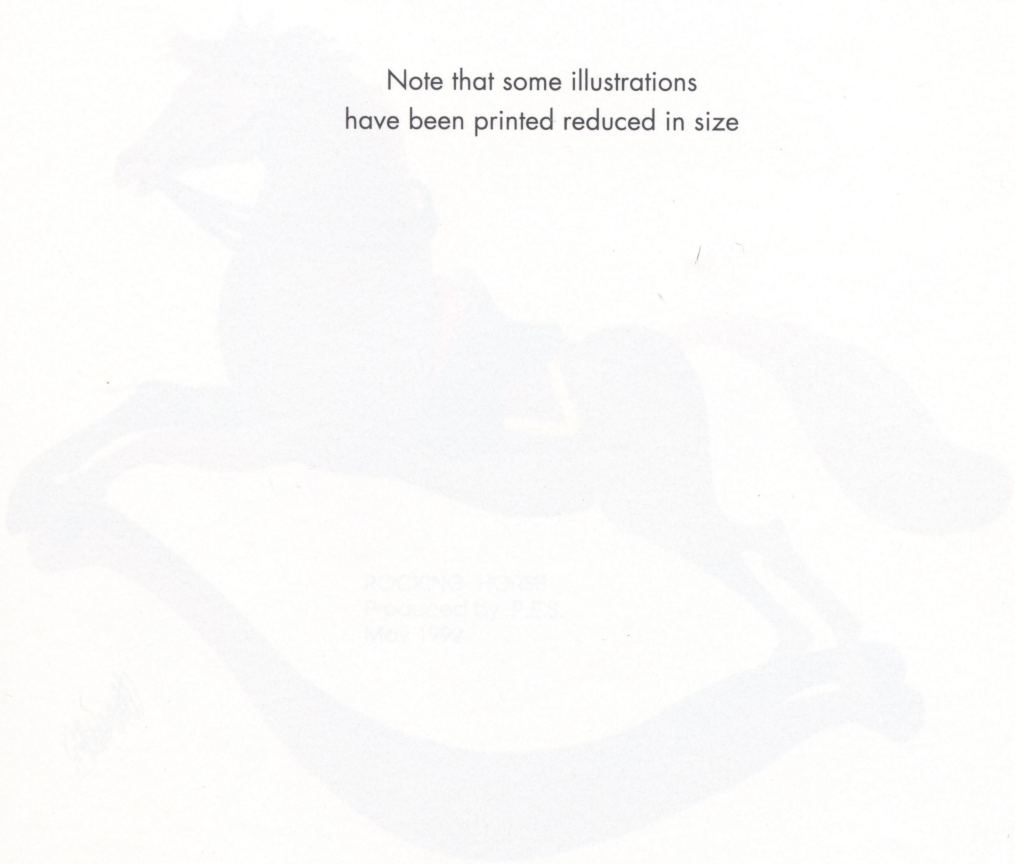


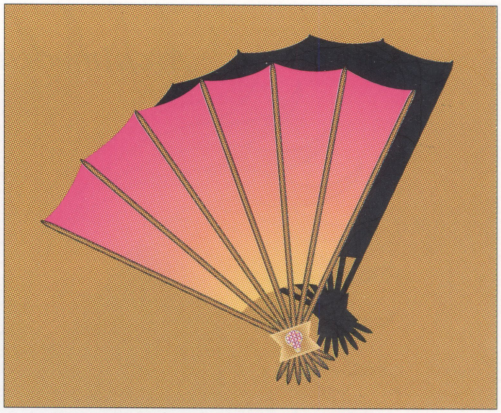
CMYK colour mixes - 2

Samples of Clip-Art

from the ArtWorks discs

Note that some illustrations
have been printed reduced in size

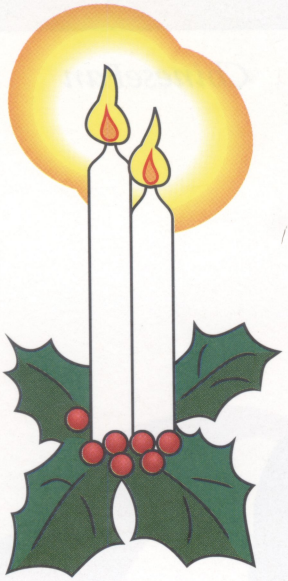




ChineseFan

ROCKING HORSE
Produced by P.E.S.
May 1992

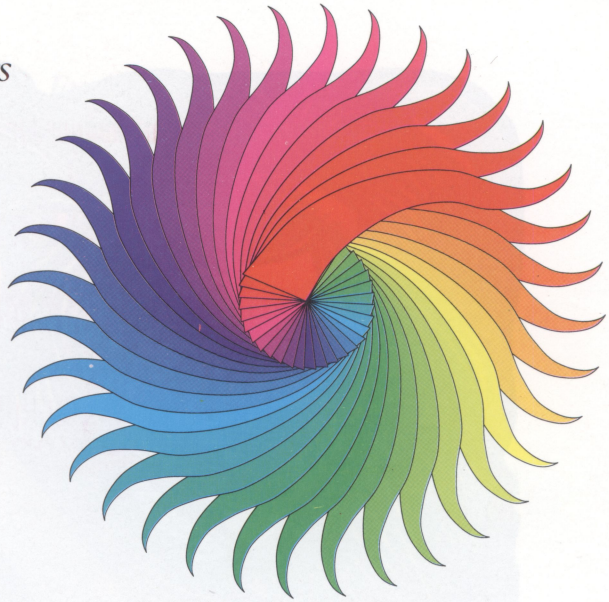
Archimedea



Candles

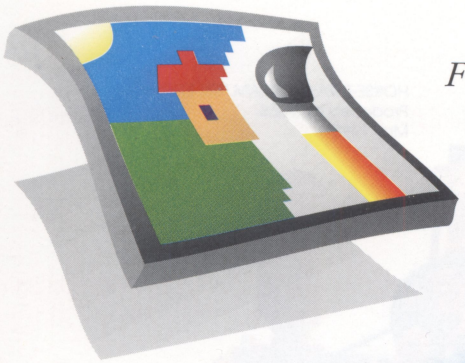
CYCLAMEN

Colours



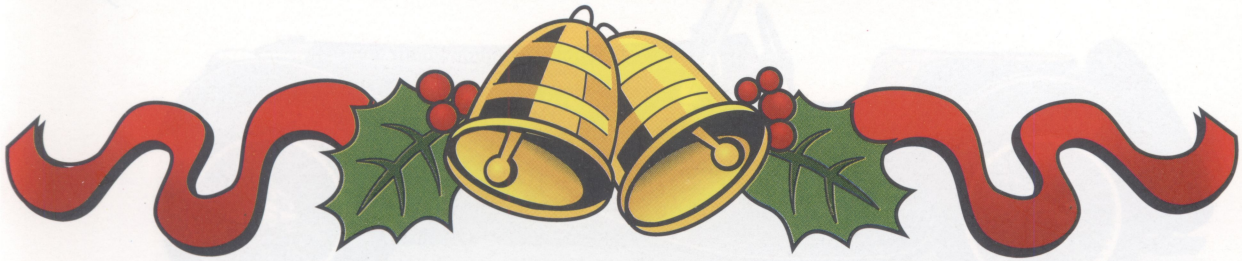
Ship

Girl



FunkySP

Abug

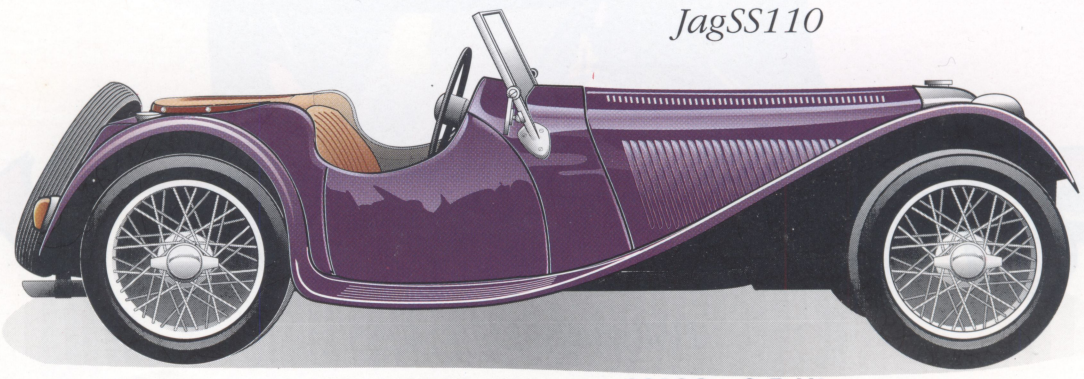


HollyBells

HORSE-DRAWN STEAM FIRE ENGINE
Produced by **P.E.S.**
May 1992

Fire

JagSS110



1937 - Jaguar SS100 - 2.5 Litre

Produced by AB Designs - February 1992